

## Effects Of Different Map Interpolation Techniques On The Twt Surface Map

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### ABSTRACT

Interpolation is a procedure used to predict the values of cells at locations that lack sampled points. It is based on the principle of spatial autocorrelation or spatial dependence, which measures degree of relationship or dependence between near and distant objects. This abstract concentrates on the creation of a surface and effects of techniques in the Petrel E&P Software grid. A grid representation of a surface is considered to be functional surface because for any given x, y, location, it stores on single z value as opposed to multiple z values. Functional surfaces are continuous because an x, y location has only one z value regardless of the direction from which the x, y point is approached. Functional surfaces are 2.5-dimensional surfaces, not true three-dimensional surfaces. Functional surfaces can be used to represent terrestrial surfaces that depict the Earth's surface, statistical surfaces that describe demographic and other types of data, and mathematical surfaces that are based on arithmetic expressions. Different expressions or algorithms are adopted depending upon the specific data availability as well as the type of result being expected. Some common surface map interpolation techniques are Convergent interpolation, Isochore, Minimum Curvature, Moving Average, Kriging Interpolation etc. The time structure surface of a known area from Shahgarh sub-basin, Jaisalmer basin, Rajasthan is generated using Petrel E&P Software post well log correlation, well-tie correlation and seismic correlation. All the major and minor faults were marked all over the area. The markings along inline surfaces are verified using trace identifications on crossline surfaces and vice-versa. To understand the area, the fault-marked horizon is converted into a Two Way Time (TWT) Map. Of all the available interpolation techniques, based on the condition been worked upon and the data availability only few of many interpolation techniques are chosen. It is observed that the map generated using the selected algorithms are only slightly different than rest of the maps. Few maps presented many major changes with respect to others, especially in areas of high details like those of close contours, high degree of faulting, etc. Minor variations in most of the maps are justified as map of the same horizon using different techniques should indicate towards similar characteristics. The reason behind these variations is attributed to the fact that all algorithms are meant to be used condition-wise and using them for a single surface yields differences in the results. In this study, these effects of TWT mapping techniques and the reasons behind generated variations are studied on a surface of a known area in Shahgarh sub-basin, in Jaisalmer Basin, Rajasthan. On the basis of data availability, methods namely Convergent Interpolation, Isochore Interpolation, Minimum Curvature Interpolation, Gaussian Random Function Simulation Interpolation, Sequential Gaussian Simulation Interpolation, Kriging, Closest and Artificial Algorithms